4b Analysis for Gorst Creek

The Washington Department of Ecology (Ecology) Integrated Report (IR), which was submitted to EPA in May 2008, has excluded one listing for fecal coliform in Gorst Creek (7643) from the 303(d) list and placed this waterbody in category 4b of the IR. These water bodies were listed in Category 4b of the 2004 IR. Ecology's basis for excluding this waterbody from the 303(d) list is outlined in this evaluation.

Identification of Segment and Statement of Problem Causing Impairment

The Gorst Area Sanitary Survey Project was initiated in November,1995, with the initial phase of the project completed in April, 1996. Follow-up activities are still performed to date. The Gorst area is an older, urbanized, residential area where most property parcels were platted and developed prior to existing on-site sewage system (OSS) regulations. The Gorst area was found to have an OSS failure rate of 14% (47 failures out of 341 systems surveyed) during the 1995-96 sanitary survey. Of the 47 failing OSS, 28 were residential sites and 21 were business sites. All of the failing OSS have either had a permanent or temporary repair.

The survey focused on properties that are most proximate to streams and the marine shoreline, but because drainage systems can deliver stream pollutants from remote places in the watershed, fecal coliform pollution was tracked back to the source.

Additionally, failing OSS in the Gorst area were found to be contaminating natural freshwater sources and the stormwater systems in the area. During the project, 21% of shoreline discharge samples and 47% of stormwater system samples exceeded 1,600 fecal coliform/100ml, an indication of the presence of raw sewage. All of the freshwater and stormwater sources discharge directly into Sinclair Inlet.

Description of Pollution Controls and How They Will Achieve Water Quality Standards

In 1993, the Kitsap County Board of Commissioners adopted Ordinance 156-1993, establishing the Kitsap County Surface and Stormwater Management Program (KCSSWM). The goals of the program are to:

- Protect public health and natural resources.
- Minimize institutional costs.
- Obtain support for the program from other municipalities, tribal governments, and county residents.
- Meet state and federal regulatory requirements.
- Provide a permanent funding source to address nonpoint source pollution.

The county's intent is to meet Washington's numeric criteria for fecal coliform by eliminating anthropogenic sources and to stay in compliance in the future through an on-going monitoring and correction program.

Surface and Stormwater Management Program (SSWM) fees are assessed on properties in the unincorporated area of Kitsap County. Fees appear on annual property tax billings. The 2008 budget for the SSWM is $5.6 million.

Funds are shared by the Kitsap County Public Works Department, which oversees the entire program; the Kitsap County Health District, which performs water quality monitoring, pollution identification and control, and wellhead protection programs; the Kitsap County Department of Community Development, which uses the funds for watershed planning; and the Kitsap Conservation District, which helps with agricultural landowner technical assistance, education, and source control.

The PIC Program uses water quality monitoring data to identify priority water bodies for clean up. The primary focus of the monitoring program is to assess long-term pollution trends associated with human sewage and animal waste from nonpoint sources. Health district staff sample water quality monthly at approximately 95 stations on 54 streams and bimonthly at 67 marine stations. Field equipment measures turbidity, dissolved oxygen, pH, and temperature. Fecal coliform samples are analyzed by an Ecology accredited laboratory. Data are used to identify areas in need of pollution control and to evaluate the effectiveness of the correction program.

Clean up projects are designed to address the causes and sources of bacterial water pollution in specific geographic areas that the trend monitoring program has identified. SSWM provides funding for PIC projects. The goal of each PIC project is to:

- Protect public health.
- Protect shellfish resources.
- Preserve, protect, and restore surface water quality.

Through its monitoring program, the Health District identified the source of impairment in Gorst Creek as:

- Failing on-site septic systems.

The best management practices (BMPs) being used to improve water quality include a requirement to properly operate and maintain on-site systems in the watershed. The Health District is actively engaged in on-site system education, dye testing of suspect systems, and enforcement of Kitsap County Board of Health Ordinance 2008-11, *On-Site Sewage System and General Sewage Sanitation Regulations*, which requires proper design, installation, repair, operation and maintenance of on-site septic systems.

Several enforceable pollution controls will assure that compliance with water quality standards is achieved.

- Kitsap County Ordinance 156-1993, establishing the Surface and Stormwater Management Program, which created an on-going, stable source of funding.
- Kitsap County Board of Health Ordinance 2008-11, *On-Site Sewage System and General Sewage Sanitation Regulations*, which requires proper design, installation, repair, operation and maintenance of on-site septic systems.

- Kitsap County Board of Health Ordinance 2004-2, *Solid Waste Regulations*, which regulate handling and disposal of animal manure and pet waste; animal waste violations are enforced by the Health District under this ordinance.

Kitsap County Health District continues to have regulatory presence in the Gorst Creek watershed to:

- Track water quality trends in fecal coliform concentrations through the Health District's on-going, countywide monitoring program;
- Respond to sewage complaints and repair failing on-site sewage systems;
- Re-inspect watershed on-site sewage systems and farms;
- Work with Kitsap CD to address any farms found to be violating state water quality standards for fecal coliform.

Five failing on-site sewage systems were identified and repaired in the Gorst area since 2005. In addition, the City of Bremerton will soon be running a sewer force main through Gorst to provide service to a new development on incorporated land on the east side of Sinclair Inlet. This force main has been sized to handle both the new development and the Gorst area. Once this force main is installed, the Health District plans to work with the City of Bremerton and local residents to find funding for a sewer collection system for the Gorst area.

Estimate or Projection of Time When Water Quality Standards Will be Met

The designated use for Gorst Creek is primary contact recreation. Washington's standard for fecal coliform for these waters has two parts. Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies /100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies /100 mL.

If a water body is subject to a Total Maximum Daily Load (TMDL), a load allocation may be set that is stricter than the state standard. Gorst Creek and the Gorst basin are included in the Sinclair and Dyes Inlets fecal coliform TMDL, which is in development. If this TMDL establishes stricter goals than the state standard, this 4b analysis will be revised accordingly. Because the TMDL goals have not yet been established, this 4b analysis reflects the state standards for fecal coliform.

Water quality in Gorst Creek went from a 12-sample geometric mean fecal coliform count of 111 in 1996 to a geometric mean of 73 in 2004. At that time, the county estimated that Gorst Creek would meet Washington's fecal coliform standard by 2005.

Fresh Water Stream Fecal Coliform (FC) Results
Gorst Creek (GR01), 1996-2007

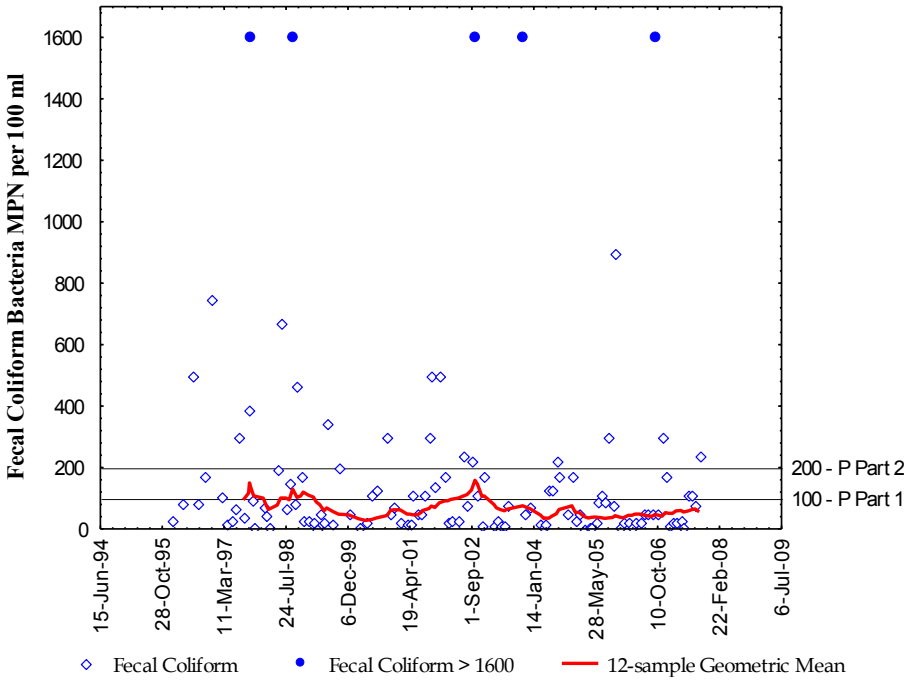
Water year	Number of Samples	Range (FC/100ml)	GMV[1] (FC/100ml)	# Samples > 200 FC/100ml	% Samples > 200 FC/100ml	Meets WQ Standard[2]
96	5	30 - 500	111	1	20%	No
97	8	17 - 748	102	3	38%	No
98	11	7 - ≥1600	118	3	27%	No
99	12	< 2 - 465	48	2	17%	No
00	5	8 - 130	42	0	0%	Yes
01	11	17 - 300	63	2	18%	No
02	11	23 - ≥ 1600	149	5	45%	No
03	11	9 - 500	45	1	9%	Yes
04	10	4 - ≥ 1600	73	2	20%	No
05	12	2 - 300	36	0	0%	Yes
06	12	4 - ≥ 1600	47	2	17%	No
07	12	8 - 300	56	2	17%	No

Shaded entries indicate an exceedance of the applicable water quality standard (Chapt.173 – 201A-030 WAC)

[1] Geometric mean value

[2] State standard - FC levels shall not exceed a GMV of 100 FC/100ml and not have more than 10% of all samples exceed 200 FC/100 ml.

Fecal Coliform Bacteria Trend Analysis
Gorst Creek (Station GR01, Mouth), 1996 – 2007
Improving Trend



Gorst Creek
Station GR02

Water Year	Number of Samples	Range (FC/100ml)	GMV[1] (FC/100ml)	# Samples > 200 FC/100ml	% Samples > 200 FC/100ml	Meets WQ Standard[2]
2003	12	2 - 300	51	2	17%	No
2004	9	7 - ≥1600	64	3	33%	No
2005	12	4 - 170	36	0	0%	Yes
2006	12	7 - ≥1600	45	2	17%	No
2007	12	<2 - 300	35	1	8%	Yes

As the most recent data show, water quality has been on a generally improving trend at station GR02 and somewhat more variable at station GR01. In fact Washington's fecal coliform standard was met at station GR02 in 2007. We expect the county's on-going work in the Gorst area to achieve compliance with standards by 2010.

Schedule for Implementing Pollution Controls

As described earlier in this report, Kitsap County has already implemented the PIC program and is continuing periodic monitoring, identifying problems, and fixing them. This is an on-going program, exactly what's needed to solve nonpoint pollution problems and to keep them from happening again.

Monitoring Plan to Track Effectiveness of Pollution Controls

Kitsap County has a countywide monitoring program, and monitors Gorst Creek as part of that on-going program. Samples are taken monthly and compared to the two parts of the fecal coliform standard. Assessment results are reported to the public and EPA through Ecology's IR report development process.

Commitment to Revise Pollution Controls as Necessary

Ecology will continue to work with Kitsap County to ensure that the PIC program continues and that water quality in Gorst Creek continues to improve. We fully expect the program to achieve compliance with water quality standards or, if established, a stricter TMDL load allocation for fecal coliform. However, if it does not, Ecology will work with Kitsap County to determine other controls that could be used to achieve compliance.